



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/549,283	06/21/2006	Yasunori Hatamura	278215US6YAPCT	2461
22850	7590	01/21/2011		
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER ZERVIGON, RUDY	
			ART UNIT	PAPER NUMBER
			1716	
			NOTIFICATION DATE	DELIVERY MODE
			01/21/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com

oblonpat@oblon.com

jgardner@oblon.com

Office Action Summary

Application No.

10/549,283

Applicant(s)

HATAMURA ET AL.

Examiner

Rudy Zervigon

Art Unit

1716

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 January 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9, 21-26 and 28-31 is/are pending in the application.
- 4a) Of the above claim(s) 30 and 31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 21-26, 28 and 29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-946)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 1/4/2011
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 14, 2010 has been entered.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-5, 7-9, 21-26, 28, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schneider; Gerhard M. et al. (US 6364957 B1) in view of Ke; Kuang-Han et al. (US 6284093 B1). Schneider teaches a focus ring (290; Figure 3, 11; column 8; lines 45-67) assembly configured to reduce process effects on the backside of a substrate that is cantilevered beyond an edge of a substrate holder support surface (15/245 interface; Figure 11) on which the substrate rests, the focus ring (290; Figure 3, 11; column 8; lines 45-67) assembly comprising: a focus ring (290; Figure 3, 11; column 8; lines 45-67) positioned on a step receiving surface (290/245 interface; Figure 11), of the substrate holder (245; Figure 11) which is axially recessed from the substrate holder support surface (15/245 interface; Figure 11) and extends radially outward from the edge of the substrate holder support surface (15/245 interface; Figure 11), the focus ring (290; Figure 3, 11; column 8; lines 45-67) comprising: a bottom surface (bottom of

290) which contacts the step receiving surface (290/245 interface; Figure 11) of the substrate holder (245; Figure 11) a top surface (top of 290) which opposes the bottom surface (bottom of 290), and a lip (outermost radial position of 290; Figure 8) having a lip receiving surface (outermost radial position of 290; Figure 8) axially located between the bottom surface and top surface of the focus ring (290; Figure 3, 11; column 8; lines 45-67), such that the lip (outermost radial position of 290; Figure 8) receiving surface is located below a backside surface of a substrate resting on the substrate support surface (15/245 interface) of the substrate holder (245; Figure 11), and an outer radial lip (outermost radial position of 290; Figure 8) surface positioned radially outward from a peripheral edge of the substrate and extending substantially perpendicularly upward from the lip (outermost radial position of 290; Figure 8) receiving surface to the top surface of the focus ring (290; Figure 3, 11; column 8; lines 45-67) such that the peripheral edge of said substrate is substantially parallel to the outer radial lip (outermost radial position of 290; Figure 8) surface and a clearance space (between lower 15 and top 290) is formed between a cantilevered portion of the substrate and the lip (outermost radial position of 290; Figure 8) of the focus ring (290; Figure 3, 11; column 8; lines 45-67); and a secondary focus ring (282; Figure 11) positioned on the step receiving surface (inner radial step of 290) of the focus ring (290; Figure 3, 11; column 8; lines 45-67), the secondary focus ring (282; Figure 11) including an outer radial edge surface (inner radial edge surface of 215 – vertical surface) extending axially upward to the lip (outermost radial position of 290; Figure 8) receiving surface and positioned radially outward from the peripheral edge of the substrate wherein said focus ring (290; Figure 3, 11; column 8; lines 45-67) is configured to couple to the focus ring (290; Figure 3, 11; column 8; lines 45-67) assembly (130; Figure 11) which is configured to support the

substrate (15; Figure 3) exposed to a process in a processing system (Figure 3), and said secondary focus ring (282; Figure 11) is configured to reduce deposition of material (column 9, lines 5-19) from said process on the backside surface of said substrate (column 8; line 37), as claimed by claim 1. Applicant's amended claim requirements of "the secondary focus ring including an inner radial edge surface positioned radially outward from the peripheral edge of the substrate", "positioned radially outward from a peripheral edge of the substrate", and "to reduce process effects on the backside of a substrate", and "such that the peripheral edge of said substrate is substantially parallel to the outer radial lip surface" are intended use claim requirements in the pending apparatus claims depending on the size (diameter) of the substrate 15 used. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

With respect to Applicant's claim requirements of "said secondary focus ring (282; Figure 11) is configured to reduce deposition of material from said process on the backside surface of said substrate", when the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

Schneider further teaches:

- i. The focus ring assembly (Figure 11) as recited in claim 1, wherein said secondary focus ring (282; Figure 11) comprises a compliant material (column 9, lines 5-19), as claimed by claim 2
 - ii. The focus ring assembly (Figure 11) as recited in claim 2, wherein said compliant material (column 9, lines 5-19) comprises at least one of silicone rubber, polyimide, and Teflon, as claimed by claim 3
 - iii. The focus ring assembly (Figure 11) as recited in claim 1, wherein said secondary focus ring (282; Figure 11) comprises a rigid material (column 9, lines 5-19), as claimed by claim 4
 - iv. The focus ring assembly (Figure 11) as recited in claim 4, wherein said rigid material (column 9, lines 5-19) comprises at least one of a ceramic material (column 9, lines 5-19), silicon, silicon carbide, silicon nitride, silicon dioxide, carbon, sapphire, and alumina, as claimed by claim 5
 - v. The focus ring assembly (Figure 11) as recited in claim 1, wherein the clearance space comprises an axial clearance space between the lip receiving surface of the focus ring (290; Figure 3, 11; column 8; lines 45-67) and said backside surface on said substrate, and said secondary focus ring reduces said axial clearance space, as claimed by claim 7.
- However, Applicant's claim requirements are believed to be claim requirements of intended use in the pending apparatus claims. Applicant's claim requirements hinge on the dimension(s) of the substrate used. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106).

Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

- vi. The focus ring assembly (Figure 11) as recited in claim 7, wherein the clearance space (between lower 15 and top 290) comprises a radial clearance space (between lower 15 and top 290) between the peripheral edge of the substrate and the outer radial lip (outermost radial position of 290; Figure 8) surface of the focus ring (290; Figure 3, 11; column 8; lines 45-67) said secondary focus ring also reducing the radial clearance space (between lower 15 and top 290), as claimed by claim 8. When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01). Applicant's "clearance space"/"radial clearance space" is also considered an intended use of the claimed apparatus because the claimed "clearance space"/"radial clearance space" is a function of the size/diameter of the processed wafer which is not part of the apparatus. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the

- intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).
- vii. The focus ring assembly (Figure 11) as recited in claim 8, wherein said secondary focus ring (282; Figure 11) eliminates said axial clearance space (between lower 15 and top 290), as claimed by claim 9. When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01). Applicant's "axial clearance space" is also considered an intended use of the claimed apparatus because the claimed "axial clearance space" is a function of the size/diameter of the processed wafer which is not part of the apparatus. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).
- viii. The focus ring assembly (Figure 11) as recited in claim 1, wherein the outer radial lip surface (outermost radial position of 290; Figure 8) of the focus ring (290; Figure 3, 11; column 8; lines 45-67) is positioned radially outward from an outer radial edge surface (innermost radial edge of 282) of the secondary focus ring (282; Figure 3, 11; column 8; lines 45-67), as claimed by claim 21

- ix. The focus ring assembly (Figure 11) as recited in claim 1, wherein the outer radial lip surface (innermost radial edge of 290) of the focus ring (290; Figure 3, 11; column 8; lines 45-67) is positioned radially outward from and in contact with an outer radial edge surface of the secondary focus ring (282; Figure 3, 11; column 8; lines 45-67), as claimed by claim 22
- x. The focus ring assembly (Figure 11) as recited in claim 1, wherein the secondary focus ring (282; Figure 3, 11; column 8; lines 45-67) has an annular shape and a cross-section of the secondary focus ring (282; Figure 3, 11; column 8; lines 45-67) has a rectangular shape, as claimed by claim 23
- xi. The focus ring assembly (Figure 11) as recited in claim 1, wherein the focus ring (290; Figure 3, 11; column 8; lines 45-67) has an annular shape and a cross-section of the secondary focus ring (282; Figure 3, 11; column 8; lines 45-67) has an L-shape, as claimed by claim 24
- xii. The focus ring assembly (Figure 11) as recited in claim 1, wherein the secondary focus ring (282; Figure 3, 11; column 8; lines 45-67) is positioned entirely radially outward from the substrate, as claimed by claim 25 – depends on size of substrate, as claimed by claim 25
- xiii. The focus ring assembly (Figure 11) as recited in claim 1, wherein the secondary focus ring (282; Figure 3, 11; column 8; lines 45-67) includes an upper surface that is substantially planar with a top surface of the substrate, as claimed by claim 26
- xiv. The focus ring assembly (130; Figure 3, 11; column 8; lines 45-67) as recited in claim 1, wherein the entire secondary focus ring (282; Figure 11) is positioned radially inside of

the outer radial lip surface of the focus ring (290; Figure 3, 11; column 8; lines 45-67), as claimed by claim 28

Schneider does not teach:

- i. a top surface (top of 290) that is axially positioned at a higher level than the substrate support surface (245/15 interface) when the focus ring (290; Figure 3, 11; column 8; lines 45-67) is positioned on the step receiving surface (290/245 interface; Figure 11) of the substrate holder (245; Figure 11), and also positioned at substantially same planar level as a top surface of the substrate – claim 1. However, Applicant's claim requirement "and also positioned at substantially same planar level as a top surface of the substrate" is a claim requirement of intended use in the pending apparatus claims depending on the dimensions of the substrate that is not part of the apparatus.
- ii. the secondary focus ring (282; Figure 11) including an inner radial edge surface (inner radial edge surface of 215 – vertical surface) extending axially upward from the lip (outermost radial position of 290; Figure 8) receiving surface – claim 1
- iii. the focus ring assembly (130; Figure 3, 11; column 8; lines 45-67) as recited in claim 1, wherein the focus ring (290; Figure 3, 11; column 8; lines 45-67) extends further radially inward than the secondary focus ring (282; Figure 11), as claimed by claim 29

Ke teaches a focus ring assembly in Figures 5,6 such that the the focus ring (30; Figure 5,6) extends further radially inward than the secondary focus ring (58; Figure 5,6).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Schneider to optimize the length of Schneider's focus ring (290; Figure 3, 11; column 8; lines 45-67) as taught by Ke.

Motivation for Schneider to optimize the length of Schneider's focus ring (290; Figure 3, 11; column 8; lines 45-67) as taught by Ke is for added support or to meet dimensional requirements to position the substrate as desired.

4. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schneider; Gerhard M. et al. (US 6364957 B1) and Ke; Kuang-Han et al. (US 6284093 B1) in view of Wicker; Thomas E. et al. (US 6464843 B1). Schneider and Ke are discussed above. Schneider and Ke do not teach that the focus ring assembly (Figure 11) as recited in claim 1, wherein said secondary focus ring (282; Figure 11) comprises silicon having a resistivity less than or equal to $1\ \Omega\text{-cm}$.

Wicker teaches a plasma processing system (Figure 1) employing focus rings with resistivities of below $200\ \Omega\text{-cm}$ (column 6; lines 50-65).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Schneider to use materials with resistivities of below $200\ \Omega\text{-cm}$ as taught by Wicker.

Motivation for Schneider to use materials with resistivities of below $200\ \Omega\text{-cm}$ as taught by Wicker is for reducing particle contamination in the processed wafer as taught by Wicker (column 6, lines 1-15).

Response to Arguments

5. Applicant's arguments filed December 14, 2010 have been fully considered but they are not persuasive.

6. Applicant states:

“

Turning now to the merits, in order to expedite issuance of a patent in this case, Claim 1 is amended to include structural features that are neither taught nor suggested in the cited references. Specifically, Claim 1 recites that the focus ring includes a top surface which opposes the bottom surface and is axially positioned at substantially a same planar level as a top surface of the substrate.

“

And...

“

In addition, however, amended Claim 1 further recites that the outer radial lip surface of the focus ring extends substantially perpendicularly upward from the lip receiving surface to the top surface of the focus ring such that the peripheral edge of said substrate is substantially parallel to the outer radial lip surface. This claim feature is also shown in each of Figs. 2-6 of Applicants' specification. However, as seen in the figures of each of Schneider et al. and Ke et al., the collar 130 and shield 30, respectively, include a flanking surface that extends from the substrate holder surface in a diagonal direction upward to the top surface positioned far above the substrate top surface. Thus, Schneider et al. and Ke et al. also do not disclose that the peripheral edge of said substrate is substantially parallel to the outer radial lip surface. This provides an additional distinction of claim 1 over the cited references

“

In response, the Examiner again urges Applicant to claim his apparatus in a manner that does not relate the size/position of the claimed structure relative to the substrate. The above claim amendments are considered intended use recitations because the claimed apparatus is a function

of the size of the to-be-processed substrate. The Examiner emphasizes that the entirety of Applicant's claims are not dependent on the substrate's position/dimension(s), however, the above-cited portions are.

Conclusion

7. This is a continued examination of applicant's earlier Application No. 10549283. All claims are drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the earlier application. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action in this case. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no, however, event will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272-1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 6pm EST. The fax phone number for the organization where this application or

Art Unit: 1716

proceeding is assigned is 571-273-8300. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272- 1435.

/Rudy Zervigon/

Primary Examiner, Art Unit 1792